Zero Retries issue 0075 2022-12-02

Zero Retries is an independent email newsletter about technological innovation in Amateur Radio, for a self-selecting niche audience. It's free (as in beer) to subscribe.

About Zero Retries

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Request To Send

The Power of No.

I keep learning this lesson the hard way.

I say Yes to too many things. Jeff Geerling recently reminded me of the true cost of doing so. Geerling is a prolific and very good YouTube creator. There's no hint on his YouTube channel that he's dealing with Crohn's disease (which lands him in the hospital several times per year, including significant surgeries) *and* he's a father to three young children. As a fan of the ever-evolving Raspberry Pi technology, I learn *constantly* from Geerling. As Geerling explains in the linked blog post, *he can't do everything*, and unless someone (or some group) is paying you money, you *don't* owe them anything. To do the good work, *you can't afford to do the bad work*.

Geerling is in good company.

Steve Jobs:

> People think focus means saying yes to the thing you've got to focus on. But that's

> not what it means at all. It means saying no to the hundred good ideas that there are. You have to pick carefully.

Warren Buffet:

> Flint replied, "Well, the top 5 are my primary focus, but the other 20 come in a close second. They are still important so I'll work on those intermittently as I see fit. They are not as urgent, but I still plan to give them a dedicated effort."
>
> To which Buffett replied, "No. You've got it wrong, Mike. Everything you didn't circle just became your Avoid-At-All-Cost list. No matter what, these things get no attention from you until you've succeeded with your top 5."

Seth Godin:

> Time and focus and energy
>
> Sooner or later, they're all finite. And the way we allocate our time and emotional energy determines what gets done.

For me, an "I can't do everything" decision point hit recently when I was asked if I wanted to continue on the ARDC Grants Advisory Committee (GAC) in 2023. While I feel that I contributed meaningfully to the GAC, and I've enjoyed working with ARDC and the other GAC members, in the end, my contributions on the GAC weren't unique (as evidenced by the nine other members of the GAC). There are others who can do that work. As the GAC's workload steadily increased in 2023, Zero Retries suffered in competition. There's no one else that can do Zero Retries - my contributions here are unique. Thus, I declined to be a member of the GAC in 2023.

That's the first of many such decision points I'm going to have to make in early 2023. Zero Retries is now almost eighteen months old, and I've completed more than seventy five consecutive issues and it's still going strong. In my mind, Zero Retries now has enough subscribers (500 and counting!) that I consider it a successful experiment. Thus I'm going to double down on Zero Retries in 2023, adding new features and enlarging the Zero Retries ecosystem and "product line".

Thank you, ***500*** subscribers (***Woo Hoo!***), for validating my vision for Zero Retries - it's only a success because you have chosen to be subscribers.

de Steve N8GNJ

Zero Retries 0075 Omnibus of Zero Retries Interesting Information

As I write this, the Zero Retries 0075 Omnibus of Zero Retries Interesting Information has grown to 11,754 words. The Omnibus is a separate web page on my SuperPacket blog - check it out there.

In this edition of the Omnibus, whenever I added, or substantially updated an entry, I prepended

that item with **New0075**, thus it was easy to do a quick search to see how many new entries there are in this edition - *86*. Readers of previous versions of the Omnibus can do the same to skip to the new entries - just search for **New0075**.

The Omnibus is a highly subjective… index… of things I find Zero Retries Interesting. Everything listed there has some relevance to what I try to discuss every week in Zero Retries - generally… *technological innovation in Amateur Radio*. I refer to the most current Omnibus constantly, often in response to an email query about some subject that someone found me mentioning in Zero Retries and wanted a pointer to learn more.

General Observation - *Lots of Networks!*

Newsflash from my work here on Zero Retries - Amateur Radio networking is resurging. Folks are recognizing that not only is it a good idea to have some form of data networking that has no dependency on the Internet.1 The resurgence I'm observing is highly decentralized; some areas are very active, other areas have no activity.

In editing this Omnibus it struck me that typical plaint of "the ongoing death of Packet Radio networks"… is severely inaccurate and misunderstood. Amateur Radio has a lot of networks - and growing!

More accurately stated, Amateur Radio networks that use mostly radios are *not easy to identify*, and rarely evangelize / advertise themselves, and thus new folks have a hard time finding such networks, which results in the oft-stated plaint that "packet radio networking is dead". But, change that up a bit to "Amateur Radio Networking" and there's…

- Winlink is a network to send and receive Internet and local email.
- APRS is a highly decoupled network to send and receive tactical data, including position and weather.
- VARA FM with its ability to interoperate with all radios (unlike 1200 and 9600 bps packet radio), built-in Forward Error Correction (FEC) and speeds of up to 25 kbps has revitalized the idea of data communications on Amateur Radio VHF and UHF.
- New and revitalized Packet Radio networks using typical VHF / UHF radios and speeds under 25 kbps.
- Networks using New Packet Radio units that can do up to 500 kbps.
- Repeaters for the Icom Digital Data mode (128 kbps).
- Many networks using microwave technology, including unmodified Part 15 units.

In my opinion, there needs to be some… clearinghouse… nexus… hub… where those that are interested in participating in Amateur Radio networks in their area can find those networks. And by "find" I don't mean a listing of the technical information for the network… there needs to be contact information for the *humans* involved in the network. At a minimum, a discussion system (email list), but better would be an individual contact point - a name, an email address, etc. where a newcomer can contact a human guide to getting connected to that network.

If you want to get Amateur Radio networking going in your area, here's a suggestion - *build up a loaner station that's compatible with the local network*. Then when someone expresses some serious interest, hand over the loaner station so they can *experience the fun of being on the network*. In my recent experience, it's not enough to document (however detailed) how to build up a network node.

I think a restatement of an old maxim applies in this situation - it's far more effective for newcomers to see what you are *willing to do* to help them get on the network, rather than what you *say* about getting on the network. In my opinion, what's *really* required for likely recruitment of newcomers is some bootstrapping. Get them hooked on the fun with a loaner unit *first*, *then* help them build up their own unit with their own resources. Once they know it can be done, and how much fun it is, they're more likely to keep going through the inevitable frustrations of building their own unit.

…

Here are a few of the most interesting and notable things of the 84 items I've added to the Zero Retries 0075 Omnibus.

ARDC Grants

> **New0075** Low-Cost Open-Source Universal Radio Test Instrument, A - Open source project from Great Scott Gadgets to create a unit that incorporates
>
> - spectrum analyzer
> - vector network analyzer
> - vector signal generator
> - vector signal analyzer
> - antenna analyzer
> - power meter
> - frequency counter
> - full-duplex SDR transceiver

I'm glad that this project did ultimately get funded by ARDC.

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Funding for Amateur Radio Interesting Projects

> **New0075** Crowd Supply - Crowdfunding for technology projects, including radios such as KrakenSDR.

I've become impressed with the quality and technical sophistication of radio technology

projects that have emerged from Crowd Supply. Back in the day, bootstrapping projects like that required an organization like TAPR to collect the reservation funding, work with vendors to get the product built, store the units for sale, shipping, credit card processing, etc. Now most of that is available through Crowd Supply.

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HF Data Communications - Hardware and Software

> **New0075** VarAC is a good chat / email / file transfer app built on top of the robust VARA HF and VARA FM modes.

As VARA HF and VARA FM use has expanded, more VARA users have discovered VarAC. Its a nice looking application, and the author can concentrate on the user-facing aspects instead of "the plumbing" that is handled by VARA HF and VARA FM.

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Interesting Projects In Development

> **New0075** Ribbit - Data communications via *any* two-way radio; modem is a smart phone app, which transmits and receives data to / from the radio acoustically.

For those of us who've been connecting radios and modems forever… with cables… it's understandable to look at Ribbit as "Oh, that's cute" and get back to wiring radios and modems. But the authors did a neat trick with Ribbit - by keeping the interface as "acoustic", they neatly sidestep all the complications about whether data modes are authorized on a particular radio service. One example is (US) Citizens Band - data modes are not included as an authorized mode. But using Ribbit requires only keying the microphone close to the smartphone's speaker. It… just works.

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Media - Websites

> **New0075** Digital Library of Amateur Radio & Communications (DLARC). This was funded by a grant from ARDC. It's making great progress with more than 30,000 items available as of this update.

DLARC has received ample attention here in Zero Retries and is now a significant resource for Amateur Radio worldwide.

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Networking - VHF / UHF - Hardware - Modems

> **New0075** Kantronics KA-Node and K-Net (link is KPC-3+ manual - see KA-Node beginning page 104) - The Kantronics KPC-3+ (below) is typically used as a digipeater or a mobile APRS modem. For years, or decades, Kantronics has incorporated the functionality of Net/ROM / TheNET Amateur Radio Packet Radio

networking into its units, and that capability is under-appreciated and underused. Kantronics has even incorporated the ability to "stack" multiple units and network them via their serial ports.

Amateur Packet Radio Networking (Net/ROM / TheNET) using the KPC-3+ is plug and play. The capability is well-proven and KPC-3+ units are reliable and thus can be installed in remote locations.

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Networking - 1240 MHz and Above

> **New0075** GL-iNet AR-300M16 (Shadow) - Small, inexpensive Wi-Fi router that is in production and supported by AREDN firmware (AREDN Stable) and available on Amazon. Ideal for experimenting with AREDN (buy three for personal experimentation with AREDN mesh networking). This unit is a good replacement for the GL-iNet AR-150 / AR-150ext.

A Zero Retries reader saw my lament that the GL-iNet AR-150 had been discontinued, and replied that the AR-300M16 (Shadow) was a suitable replacement. I think it's important to have an option like this to allow personal, localized experimentation with AREDN before diving deep into Amateur Radio microwave networking.

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Special Categories

> **New0075** FCC Experimental License (Part 5) - Experimental licenses have been granted for Amateur Radio experimentation to prove out new techniques and technologies that aren't compatible with existing FCC rules.
>
> **New0075** FCC Special Temporary Authority (STA) - STAs have been used for Amateur Radio experimentation to prove out new techniques and technologies that aren't compatible with existing FCC rules.

Most (US) Amateur Radio Operators don't realize that the Amateur Radio Service isn't the only radio service where experimentation is conducted. The lines sometimes blur as, for example, STAs can be requested by Amateur Radio Operators for experimentation, and Part 5 licenses can be granted for experimentation within spectrum allocated for Amateur Radio use. Part 5 licenses and STAs have been underutilized in Amateur Radio, and they're powerful tools for promoting experimentation and proving out new radio technologies… and building evidence to support updates of outmoded regulations.

…

Speculative Ideas

> **New0075** Decentralized Channel Management in Scalable Multihop Spread-Spectrum Packet Radio Networks- Seminal 1995 MIT thesis of Timothy Shepard KD1KY. The thesis posits that radio data networks can scale considerably better on

common channels than current practice if each radio broadcasts its proposed transmission schedule, and the other radios on the channel adjusted their transmission schedules accordingly. The network would not require a "master controller" and new radios will be accommodated dynamically. KD1KY's inspiration for this thesis paper was Amateur Radio Packet Radio. Such a system wasn't practical to implement with 1995 Amateur Radio technology... but it's now 27 years later.

In the 2020s, with ample, inexpensive compute power and inexpensive software defined transceivers, and especially *very* inexpensive software defined receivers... the system that KD1KY imagined in his thesis seems ripe for experimentation. This is a great example of an idea in Amateur Radio2 was a bit ahead of the technology of that moment, and it might be time to dust it off and see if it's practical now.

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Depricated Entries

I was sorry to remove **Eclectic Technology** and **Southgate Amateur Radio News** from the Omnibus.

ZR > BEACON

- SUPERCON Balloon W6MRR-26 Continues Its World Tour - Joseph Long: *[Martin Rothfield] and other amateur radio operators from San Francisco High Altitude Ballooning (SF-HAB) treated conference attendees to the 2022 Hackaday Supercon to the launch of two High Altitude Balloons (HABs). On the morning of November 6th, the two balloons were launched from a park across the street from Supplyframe DesignLab in Pasadena, California.*

  Seven days after its launch from Southern California, one of the balloons was over Tajikistan cruising eastward at an altitude of 42,000 feet (12,800 meters). Balloon W6MRR-26 was already approaching China where it will continue its wonderful world tour to parts unknown. The second balloon (call sign W3HAC-11) landed in northern Arizona where it has continued transmitting whenever it receives power from the sun.

  Each balloon carries a tiny payload — a printed circuit board powered only by small photovoltaic cells. The board includes a microcontroller, a GPS module, and a Weak Signal Propagation Reporter (WSPR) radio transmitter. The transmitted operates on the 20 meter amateur radio band at around 14 MHz.

- Experimental Radio News 6 - Bennett Kobb (AK4AV): *This issue is devoted entirely to experimental high-frequency (HF) or shortwave radio, including a new FCC docket accepting comments on a license application.*
  I said to AK4AV in an email comment - Thanks again for all the work that you put into this - it's a “Oh, a new ERN just came in - stop everything to read it”.

- RadioMail - *Beautiful Winlink email experience on your iPhone. Connect with the world*

from anywhere. Get the beta on TestFlight. Available soon on the Apple App Store. Pair with a VARA modem or packet KISS modem via WiFi or Bluetooth. Setup radio CAT control through rigctld. RadioMail requires a running instance of VARA modem to be available. For packet mode, Mobilinkd and DireWolf packet modems are supported.
When I was first alerted to this, I (incorrectly) thought "Oh, great, another app that does radio-via-Internet". But that's not the case, and there are a number of Amateur Radio apps on phones that are using Bluetooth and Wi-Fi, such as the Mobilinkd TNC3, to connect to modems and radios. I signed up to be notified.
My thanks to Jeff Davis KE9V and Bill Vodall W7NWP for the pointer.

- Mobilinkd TNC4 - Rob Riggs WX9O: *Just to let everyone know, we have a new TNC coming -- hopefully in January -- that will replace the TNC3. I am still unable to get the microcontroller for the TNC3 and availability has been pushed back another *year* at the distributor. However, I created a prototype TNC last year based on work I was doing on the M17 project -- and the microcontroller for that design was recently available. I've spent the last couple of weeks getting new samples made, testing the design changes that were not yet fully checked out, validating the part substitutions required, and getting in the remaining parts needed. The new TNC will be called the TNC4. The form factor will be the same.*

- VarAC V6.3.3 is here - Irad Deutsch 4Z1AC: *With some Broadcasts bug fixes & Improvements. VARA modem upgrade is also required (HF-4.6.6 / FM-4.2.6). Since the release of V6.2.4 about 4 days ago, many of you experienced challenges in configuring and using the new "VarAC Broadcasts" feature.*

  Most issues were permission/firewall related and we provided guidance as for how to handle it, but some reports were related to a sporadic bug in the VARA KISS interface. ***As for the VARA HF issue*** *- Myself and Jose (EA5HVK - author of VARA) worked around the clock in past couple of days to isolate the problem and fix it. The VARA KISS interface had to be updated for this to be fixed. VARA-FM users: The new VARA-FM (4.2.6) also fixes the CQ & DIGIPEATER issues you encountered with V4.2.5.*
  My thanks to Steve Davidson K3FZT for the pointer.

- FUNcube-1 (AO73) Now celebrating nine years in orbit! AMSAT-UK: *Another year has passed and FUNcube 1 has continued to operate from its orbit around 600km above the earth. To start with some statistics. The spacecraft creates and downlinks data in frames that run for two minute periods. It has now transmitted more that 16 million of these frames or "Sequence Numbers". Another big statistic is that more than 10 million data packets have been received by stations that have forwarded them to our Data Warehouse.*
  My thanks to Amateur Radio Weekly for the pointer.

- HamPi has documentation in the form of a Wiki - Dave Slotter W3DJS : *The goal of this wiki is to document the HamPi Distribution with a broad overview of, and links to, all included programs. So Operators can see what each package is used for. The more experienced Amateur will need to follow the links to more advanced information.*
  https://github.com/dslotter/HamPi/wiki

- Network guru needed! Orv Beach W6BI: *While PVARC [Southern California USA] has done pretty well providing a network backbone for Ventura County and surrounds, we've*

decided to move it to the next level. But we find we've exceeded our network knowledge. Any network gurus out there that would like to assist in architecting our nextgen ham radio backbone in Ventura County and beyond? If so, contact Paul WD6EBY directly: pgstrauss@verizon.net.

Updata

Bridgecom BCM-220s soon back in stock. In Zero Retries 0020 (2021-11-26), I wrote that Bridgecom had discontinued its BCR-220 mobiles and BCR-220 repeater for exhaustion of a critical part. Due to the surge in demand for these products caused Bridgecom to reconsider and ordered that critical part. It's been more than one year, so I queried Bridgecom and got this reply from Garnet Musser KN4UTR of Bridgecom Customer and Technical Support:

> We are expecting them some time around mid month.

What makes the BCM-220 notable is not just that it's a dedicated 222 MHz mobile radio, but that it has a "flat audio" connector[3] that allows the use of higher-speed data modes such as VARA FM.

At this writing, the BCM-220 isn't listed on the Bridgecom website, but it's the same radio as the BCM-144, for 222-225 MHz.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with wireless technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*
- Pseudostaffers Dan Romanchik KB6NU and Jeff Davis KE9V for continuing to spot, and write about "Zero Retries Interesting" items on his blog that I don't spot on my own.
- Amateur Radio Weekly consistently surfaces "Zero Retries Interesting" stories.

- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc. I don't use such information in any way other than seeing that most subscribers actually do read Zero Retries.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*

- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

- **Mastodon** - @n8gnj@mastadon.radio and **Twitter** (for as long as it lasts…) - ZeroRetries.

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted in beautiful Bellingham (The City of Subdued Excitement), Washington, USA

2022-12-02

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[1]

The “preppers” were way early to this observation.

[2]

I’m “claiming” it as “Amateur Radio” here because the idea was inspired by Amateur Packet Radio.

[3]

Connector is a high density D15 female connector (same as VGA monitors), but all the appropriate signals are present.